This listing of claims will replace all prior versions, and listings, of claims in the application:

The Status of the Claims

1.   (Currently Amended) A method comprising:

        estimating a cost of merging a first set of instructions and a second set of instructions using a dataflow analysis; and

        merging the first and second sets of instructions to form a merged set of instructions based on the cost of merging the first and second sets of instructions, wherein the cost of merging the first and second sets of instructions is associated with instructions that belong to only the first set of instructions and instructions that belong to only the second set of instructions.

2.   (Original) A method as defined in claim 1, further comprising:

        estimating a cost of merging the first set of instructions and a third set of instructions; and

        estimating a cost of merging the second set of instructions and the third set of instructions.

3.   (Original) A method as defined in claim 2, wherein the cost of merging the first and third sets of instructions and the cost of merging the second and third sets of instructions are greater than the cost of merging the first and second sets of instructions.

4.   (Currently Amended) A method as defined in claim 2, wherein the third set of instructions comprises a ~~third~~ critical section of instructions.

5.   (Currently Amended) A method as defined in claim 2, wherein the third set of instructions is associated with a ~~virtual~~ critical section.

6.   (Original) A method as defined in claim 1, further comprising:

removing redundant instructions from the merged set of instructions; and

assigning a physical mutual exclusion lock to the merged set of instructions.

7.   (Original) A method as defined in claim 6, wherein the redundant instructions comprise instructions used for at least one of entering a set of instructions and exiting the set of instructions.

8.   (Original) A method as defined in claim 1, wherein the first and second sets of instructions are associated with respective first and second critical sections.

9.   (Currently Amended) A method as defined in claim 1, wherein at least one of the first and second sets of instructions is associated with a ~~virtual~~ critical section.

10.   (Original) A method as defined in claim 1, wherein the dataflow analysis comprises a forward disjunctive dataflow analysis.

11.   (Cancelled)

12.   (Original) A method as defined in claim 1, wherein estimating the cost of merging the first and second sets of instructions comprises:

creating a first vector based on the dataflow analysis, wherein elements of the first vector comprise instructions contained in at least one of the first and second sets of instructions; and

creating a cost matrix based on the first vector, wherein the cost matrix contains the cost of merging the first and second sets of instructions.

13.   (Original) A method as defined in claim 12, further comprising creating a second vector having elements comprising a redundancy indicator after merging the first and the second set of instructions.

14.   (Original) A method as defined in claim 12, wherein the cost of merging the first and second sets of instructions is least expensive element in the cost matrix.

15.   (Original) A method as defined in claim 12, further comprising updating the first vector and the cost matrix after merging the first and second sets of instructions.

16.   (Original) A method as defined in claim 1, further comprising creating a partition including the first and the second sets of instructions before the first and second sets of instructions are merged.

17.   (Currently Amended) An apparatus comprising:

an instruction analysis module configured to perform a dataflow analysis;

a cost estimation module configured to determine an estimated cost of merging a first set of instructions and a second set of instructions to form a merged set of instructions; and

a partition generator configured to merge the first and second sets of instructions based on the estimated cost of merging the first and second sets of instructions, wherein the cost of merging the first and second sets of instructions is associated with instructions that belong to only the first set of instructions and instructions that belong to only the second set of instructions.

18.   (Original) An apparatus as defined in claim 17, further comprising:

a redundant instruction module configured to remove redundant instructions from the merged set of instructions; and

a mutual exclusion lock module configured to assign a first physical mutual exclusion lock to the merged set of instructions.

19.   (Currently Amended) An apparatus as defined in claim 18, wherein the redundant instruction module is configured to create a ~~second~~ vector having elements in the ~~second~~ vector comprising a redundancy indicator.

20.   (Original) An apparatus as defined in claim 18, wherein the redundant instruction module is configured to remove redundant instructions comprising instructions for

at least one of entering a set of instructions and exiting the set of instructions.

21.   (Original) An apparatus as defined in claim 17, wherein the instruction analysis module is configured to perform a forward disjunctive dataflow analysis.

22.   (Original) An apparatus as defined in claim 17, wherein the partition generator is configured to create a partition including the first and second sets of instructions before the first and second sets of instructions are merged.

23.   (Original) An apparatus as defined in claim 17, wherein the cost estimation module is configured to:

create a first vector based on the dataflow analysis, wherein the elements of the first vector comprise instructions contained in at least one of the first set of instructions and the second set of instructions; and

create a cost matrix based on the first vector, wherein the cost matrix comprises the cost of merging the first and second sets of instructions,

24.   (Original) An apparatus as defined in claim 23, wherein the partition generator is configured to determine a least expensive merge operation in the cost matrix.

25.   (Currently Amended) A machine readable medium having instructions stored thereon that, when executed, cause a machine to:

estimate a cost of merging a first set of instructions and a second set of instructions using a dataflow analysis; and

merge the first and the second sets of instructions to form a merged set of instructions based on the cost of merging the first and second sets of instructions, wherein the cost of merging the first and second sets of instructions is associated with instructions that belong to only the first set of instructions and instructions that belong to only the second set of instructions..

26.   (Original) A machine readable medium, as defined in claim 25, having instructions stored thereon that, when executed, cause the machine to:

estimate a cost of merging the first set of instructions and a third set of instructions; and

estimate a cost of merging the second set of instructions and the third set of instructions.

27.   (Original) A machine readable medium, as defined in claim 25, having instructions stored thereon that, when executed, cause the machine to:

remove redundant instructions from the merged set of instructions; and

assign a physical mutual exclusion lock to the merged set of instructions.

28.   (Original) A machine readable medium, as defined in claim 25, having instructions stored thereon that, when executed, cause the machine to:

create a first vector based on the dataflow analysis, wherein elements in the first vector comprise instructions contained in at least one of the first and second sets of instructions; and

create a cost matrix based on the first vector, the cost matrix contains the cost of merging the first and second sets of instructions.

29.   (Original) A machine readable medium, as defined in claim 28, having instructions stored thereon that, when executed, cause the machine to update the first vector and the cost matrix after merging the first and second sets of instructions.

30.   (Original) A machine readable medium, as defined in claim 25, having instructions stored thereon that, when executed, cause the machine to create a partition including the first and second sets of instructions before the first and second sets of instructions are merged.